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TECHNOLOGY DEPARTMENT

JULY 24, 1948

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Leaf-Cutter Bee

See Page 50

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MEDICINE

Check Polio-Induced Limp

By surgery it is now possible to slow down the rate of bone growth in the leg not shortened by polio in children. A chart on bone growth has been worked out.

► **CHILDREN** with polio-shortened legs can be saved from a lifetime of limping by a method announced at the First International Poliomyelitis Conference in New York.

The method consists in an exactly timed operation to shorten the longer leg. It was devised by Drs. William T. Green and Thomas Gucker III and Miss Margaret Anderson of the Children's Hospital of Boston.

A leg paralyzed in childhood commonly does not grow as rapidly as a normal leg. If only one leg is paralyzed, the child may when he is fully grown have one leg as much as four and a half inches shorter than the other.

To correct this difference, one or more of the growing ends of the bone in the longer leg is operated on so that it will grow at a slower rate. The object is to slow down the normal, longer leg to the point where the paralyzed, slower-growing leg can catch up with it in length by the time the child stops growing.

The big problem is to catch the growing end bone of the longer leg at exactly the right time. A guide for this, in the form of a chart of bone growth in 160 children, was worked out by the Boston scientists. The chart was made from measurements of X-ray pictures of the children who were observed continuously from periods of three to 11 years. The growth expectancy for the leg bones was determined for each age level from this chart. From this the scientists could predict the rate at which the longer leg would grow each year, and thus when to operate.

The child who shows signs of failure in growth and consequently has a more string bean physique may be more likely to get polio, it appears from growth studies by Drs. Neil N. Litman and James F. Bosma of the University of Minnesota.

They studied the physical progress of 216 school children who got polio during the 1946 Minnesota epidemic and compared these children's progress with that of 198 of their brothers and sisters and 607 of their classmates.

The physique and rate of growth of the brothers and sisters and classmates up to July, 1946, was close to the average for American school children. But, the scientists report, "there was a distinctly higher incidence of growth failure prior to this date in the children who contracted clinically-proven poliomyelitis in the 1946 epidemic.

"The results of this study," they conclude, "definitely show that growth failure

and susceptibility to clinical poliomyelitis are related phenomena."

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AERONAUTICS

Jet Planes for Civilians Predicted for 1951

► **JET PLANES** for civilian transportation, which will fly nearly seven miles above the surface of the earth carrying 30 passengers at 500 miles per hour, are predicted for 1951.

The prediction was made by Robert E. Hage, Boeing Airplane Company, at the meeting of the Institute of the Aeronautical Sciences at Los Angeles. By that time the commercial use of 30-passenger turbojet planes can be technically feasible and commercially profitable, he declared.

This type of transportation, he added, will offer to the commercial air passenger more speed, greater flight frequency, and more comfort at fares comparable to present standards. The goal of the airlines is increased speed, especially if at the same time improvements in safety, comfort, reliability and economy result.

Immediate development of a prototype turbojet transport will speed the development of turbojet powerplants, airport facilities, airline procedures, and the overall efficiency and growth of the American commercial air transport system. Furthermore, Mr. Hage said, a reserve of highly efficient transport aircraft will be available for military service in a future emergency.

Science News Letter, July 24, 1948

Pressurized Tanks Urged

► **PRESSURIZED TANKS** directly attached to jet engines were advocated at the same meeting to replace engine testing in either closed or open wind tunnels, by J. F. Manildi, University of California at Los Angeles. It is a less costly way and dodges serious problems that arise in tunnel testing.

In closed tunnels, he said, the problems of dissipation of heat generated within the engines and the interference due to tunnel walls are nearly insurmountable. In open tunnels the power required to insure a stream of sufficiently large cross-section is extremely large.

With pressurized tanks attached to the intake of the jet engine, the effect of both forward speed and altitude can be simulated. Installation costs and power require-

ments are much lower than for tunnel installation, and the evaluation of internal performance of the engine from the test data is vastly simplified.

Science News Letter, July 24, 1948

POPULATION

Small Cities Are Now Gaining in Importance

► **SMALL CITIES** and suburbs are increasing rapidly in size and importance and large cities are growing more slowly. Decentralization is slowly taking place in this country, with small cities as centers.

These changes have been taking place chiefly in the last 10 years, declares Prof. Donald J. Bogue of the Scripps Foundation for Research in Population Problems at Miami University.

City dwellers are gradually moving to the suburbs to escape congestion and high taxes, he finds.

At the same time, automobiles and electric power are making it possible for small communities outside the sphere of large cities to support a larger population than before. As a result, small cities are growing and developing their own tiny suburbs and farming regions.

While regions close to the big cities and those over 65 miles away have been growing faster than the big cities themselves, the zone which lies between 45 and 65 miles from the large cities has been hardly growing at all. Cities in this zone are too far from the metropolis to be suburbs and too near to avoid strong competition, Dr. Bogue points out. The next 10 years may see development of this region because of pre-fabricated housing, electric power and motor transport.

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ENTOMOLOGY

Leaf-Cutter Bee Makes Nest By Using Scissors and Paste

See Front Cover

► **THE LEAF-CUTTER BEE**, which looks like a small bumblebee, is often seen flying among rose bushes in search of tender leaves. The bee cuts leaf patches with its jaw shears, as shown on the cover of this week's *SCIENCE NEWS LETTER*, and carries them away for the construction of its nests. Favorite nooks for nests are holes in posts, and spaces under weather boarding. The bee constructs a nest by carefully fitting and pasting together leaf patches into a thimble-shaped container. Bee-bread, made from pollen, is first stored in the nest, and then an egg is laid on this lump of food. Finally the nest is sealed up with several additional patches. The bee uses oval patches for the sides, and round ones for the top and the bottom of the nest. The bee that hatches from the egg emerges by chewing a hole through the wall of leaves.

Science News Letter, July 24, 1948

ANATOMY

Find Vital Brain Centers

Discovery of the location of the centers controlling breathing and blood circulation may save the lives of patients stricken with bulbar polio.

► **DISCOVERY** of the two most vital centers of the brain controlling breathing and blood circulation was announced by Dr. A. B. Baker, University of Minnesota Medical School, at the First International Poliomyelitis Conference in New York.

They are bits of tissue each no bigger than a grape seed. They are located in the part of the brain called the medulla, or bulb, which connects the spinal cord with the brain. The bulb itself is only the size of a man's thumbnail, extending an inch and a half back into the brain.

The breathing and blood circulation centers are each really twins. That is, there is a left and a right breathing center and a left and a right circulation center. The twins of each set work together. Having two of each is a natural safety provision, like having two lungs and two kidneys. A person might get along with only one of the breathing center twins, but if both are destroyed by the polio virus or an injury, death follows.

Discovery of the exact location of these breathing and circulation centers was made during the infantile paralysis epidemic in Minnesota in 1946. Doctors had known before that injury to the bulb at the base of the brain might kill by stopping either the heart or breathing.

They knew this was the cause of death in polio when the virus invaded the bulb of the brain, in cases of bulbar polio. But when doctors at the University of Minnesota hospital saw 183 bulbar polio patients within three months, they were able for the first time to sort out the patients by symptoms.

Some, they saw, had trouble only with breathing. They had this trouble even though their breathing muscles in the chest were not paralyzed. Others had fast heart beat, and the blood pressure went way too high or way too low. Still others had trouble swallowing and talking. Obviously, different centers in the brain had been affected.

Actual location of the centers was made by examining 5,000 thinner-than-paper slices of the bulbs of brains of patients who died of bulbar polio. In every case of death from breathing trouble, the damage was in the same tiny area in the bulb. In every case of death from heart and circulation trouble, the damage was in another tiny area, but the same area in each of these circulation cases, too.

Polio patients stricken with bulbar polio this year, as many have been already in North Carolina, will have a better chance of survival, thanks to these discoveries. No

more than ten out of every hundred bulbar patients should die, Dr. Baker estimates. Most of these would be the ones whose blood circulation centers have been damaged by the virus. The ones with damage

CHEMISTRY

Halt Spread of Infection

► **DISCOVERY** of a blood chemical barometer of polio infection was announced by Drs. David Glick and Frank Gollan of the University of Minnesota Medical School at the First International Poliomyelitis Conference in New York.

The chemical is called anti-hyaluronidase. It acts to stop hyaluronidase, which is a spreading agent contained in bacteria, viruses, snake venom and bee sting venom. The spreading chemical, hyaluronidase, speeds the spread of infection through the

to the breathing centers can be kept alive in most cases by oxygen and other treatment during the acute stage.

For the patients with damage to the circulation centers no treatment has yet been discovered. The next step by Dr. Baker and associates will be to attempt to produce exactly the same damage to exactly the same tiny spot in the brains of laboratory animals. Then they can try various treatments to find one that will save the victims. When this is accomplished it will be another step in the fight against infantile paralysis.

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MUSCLE-STIMULATING DEVICE—Paralyzed muscles of a little girl are artificially exercised by this new device called a variable frequency wave generator. Developed jointly by the General Electric Research Laboratory and the G-E X-Ray Corp., the machine uses electric current to contract and relax paralyzed muscles to prevent them from wasting away through disuse. It was demonstrated for the first time at the First International Polio Conference in New York.

patients to halt the spread of infection through their bodies. Attempts are also being made to find a drug or chemical that would stimulate the body to produce more

anti-hyaluronidase itself. Discovery of such a chemical might give a kind of vaccination method for protection against polio.

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PHYSIOLOGY

Gage Muscles by Sound

A new machine called an electromyograph, reveals the state of health of muscles by allowing the doctor to hear the sound they make when they contract.

► DOCTORS can now tell by the sound a muscle makes when it contracts whether it is paralyzed, getting better or normal.

If it clicks, the muscle is in bad shape. If it makes a deep-toned "glup-glup," it is healthy. Sounds in between the click and the glup tell when the nerve of a polio patient is regenerating and the muscle coming back to normal functioning.

The machine that lets the muscle tell its story in sound as well as on a silent screen was developed at Northwestern University's Department of Nervous and Mental Diseases. It was shown at the First International Poliomyelitis Conference in New York by Dr. L. J. Pollock, head of the department, and Dr. Alex J. Arieff.

Called an electromyograph, the machine is similar to the electrocardiograph which picks up electric potentials from the heart and the electroencephalograph which picks up potentials from the brain, popularly called brain waves.

Tiny needle electrodes are stuck into the muscle to be tested and the machine turned on. The doctor then can both see and hear what the muscle is doing as it contracts. In cases of paralyzed muscle, an electric stimulator to the nerve is used. This is just placed on the skin surface over the muscle being tested. The stimulator tells whether

the nerve fibers have come down to the muscle. The machine used without the stimulator tells whether the impulses are getting to the muscles.

The machine is being used for diagnosis in war veterans and other patients with peripheral nerve injuries as well as for polio victims.

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Muscle-Testing Machine

► A MACHINE that takes the guesswork out of muscle testing and gives a big boost to the polio patient's spirits with its record in pounds of his improvement was shown at the same meeting.

The machine was devised by Dr. Willis C. Beasley of the U. S. Public Health Service.

With this machine doctors and physical therapists can for the first time get an accurate measure, in pounds, of the strength of even the weakest muscles. Heretofore strength of weak muscles has been gaged by the examiner who reports muscles as being "poor," "fair," or "good." The reports are based on the examiner's estimates from experience with how much strength he must exert to counteract the force of the muscle being tested.

Now the examiner can make the test in

the same way, but a small gage strapped on the examiner's hand is connected by means of an electronic device with the machine that gives the measurement in pounds.

Muscles so weak they can exert pressure of only one-tenth of a pound can be tested as well as strong muscles capable of exerting 300 to 400 pounds of pressure.

Patients, especially children working to strengthen weakened muscles, are greatly encouraged by hearing reports given in figures rather than in vague terms. A child, Dr. Beasley explained, is stimulated to compete when he finds a muscle that rated six pounds has gone up to eight or ten. Whereas a difference from "poor" to "fair minus," for example, would not be so encouraging.

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MEDICINE-TECHNOLOGY

Iron Lung Has Substitute

New electronic respirator, which may prove a boon to polio patients and poisoning victims, will get its first trial this summer.

► AN electronic substitute for an iron lung will get its first trials on polio patients this summer.

This new method of giving artificial respiration, which may also be used to save victims of barbiturate sleeping medicine poisoning and electric shock, was reported by Drs. James L. Whittenberger, Stanley J. Sarnoff and Miss Esther Hardenbergh, Harvard School of Public Health, at the First International Poliomyelitis Conference in New York.

First and only patient on whom the apparatus has been used so far was a woman with a "fast hiccup," technically termed diaphragmatic flutter. But the doctors do not know yet whether hiccup sufferers in general could be helped by the apparatus. It was tried on this patient because the surgeon was opening her chest anyway to cut the phrenic nerve to her diaphragm.

For polio patients and poisoning victims the doctor would make a small cut in the patient's neck and attach a silver electrode to the phrenic nerve at that point. The electrode leads to the electronic stimulator. As soon as this is turned on, the patient loses all desire to breathe and the machine takes over. The patient does not fight it as he often does the iron lung.

The electronic stimulator can be regulated so that slow, deep breathing with plentiful intake of air goes on automatically. The machine plus its batteries is small enough to be carried anywhere and can be used in an ambulance as well as in the hospital. Nursing care of polio patients will be much easier than when the patient is in an iron lung.

To make the electronic respirator more useful to poisoning and electric shock victims, the scientists hope to find a way of concentrating and focussing the current from the machine to the phrenic nerve so that it will not be necessary to make the cut in the neck and attach an electrode.

A new way of taking blood pressure which promises to help victims of "blue baby" and other heart and circulation defects has also been developed by Drs. Whittenberger and Sarnoff.

Instead of putting a cuff around your arm, doctors using this method will insert a small rubber tube into a vein in your arm and gently push it up into your heart and through the heart into the main artery leading to the lungs. As the doctor withdraws this tube the newly devised pressure-taking machine records the different blood pressures in the lung artery and the valves and auricles and ventricles of the heart.

Pressures in these different places may vary from two to 60. But the new machine shows the small ones just as clearly, accurately and quickly as the big ones. So the doctor can tell at once where and what kind of defect in blood circulation is present. Besides helping diagnose various ailments, the machine is expected to give entirely new knowledge of the blood vessels in the lungs.

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PLANT PHYSIOLOGY

Human Saliva Inhibits Germination of Seeds

► HUMAN SALIVA contains something that prevents some seeds from germinating and checks the growth of those that do sprout, experiments by Dr. Dvora Yardeni of the Hebrew University in Jerusalem have demonstrated. (*Science*, July 16).

Dr. Yardeni treated seed wheat with saliva collected from 33 persons of both

sexes and ranging in age from six to 68 years. Some of the treatments were at full strength, others with various dilutions.

Subsequent germination behavior showed a wide range in the inhibiting power of various samples, though there was no discernible correlation with either sex or age of the contributing individual. As a rule, undiluted saliva had greatest effect, but in a few cases greater inhibition of sprouting was obtained with a 50% dilution.

The inhibiting effect seemed to be principally on the radicle, or first small root; in many cases this failed to come out at all, though there were at least beginnings of shoot development.

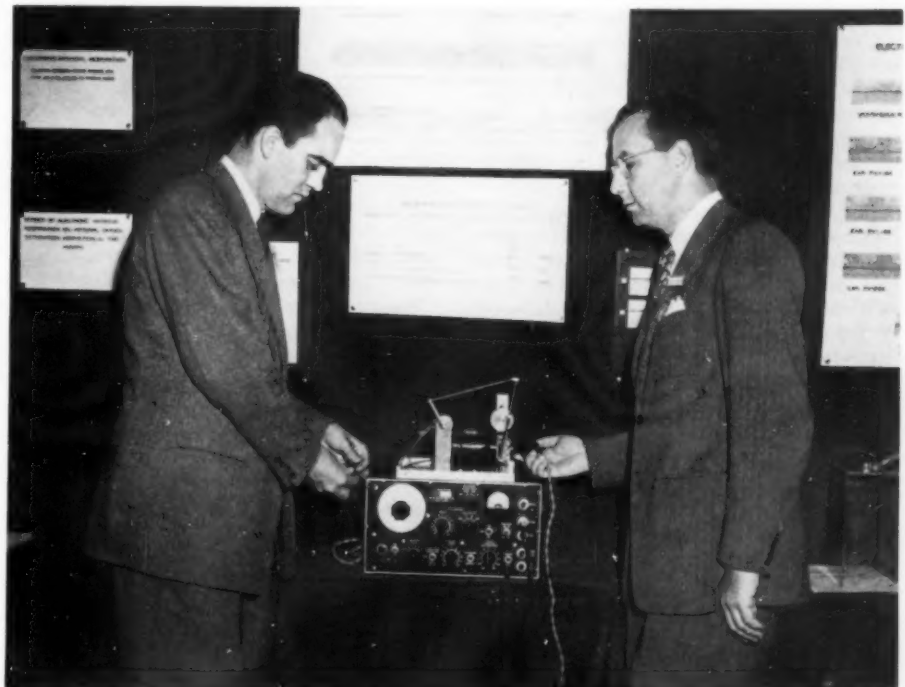
Dr. Yardeni was prompted to undertake the experiments by two different groups of observations made by other workers: (1) that human saliva has a bacteriostatic effect, like that of penicillin; (2) that various antibiotic chemicals have a germination-inhibiting effect on seeds.

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PHYSIOLOGY

Diet of Milk Causes Liver Damage in Rabbits

► CIRRHOSIS—gin-drinker's liver to you—can result from an exclusive diet of milk. Rabbits and guinea pigs have shown that nearly perfect food to be not quite perfect; it lacks something that protects the



ELECTRONIC RESPIRATOR—This experimental model, which may prove to be an iron lung substitute, is demonstrated by Drs. James W. Whittenberger and Stanley J. Sarnoff of Harvard. When produced for general use, it will be only about half this size and have fewer dials and knobs. Dr. Whittenberger at left is holding the silver electrode that is attached to the patient's phrenic nerve through a small cut in the neck.

liver against tissue breakdown and the degenerative fibrous and fatty growth that constitute cirrhosis, and also something that promotes normal growth.

This dietary deficiency in milk was discussed by Edward J. Thacker of the staff of the U. S. Plant, Soil and Nutrition Laboratory, before the seventh annual meeting in Ithaca, N. Y., of the Laboratory's collaborators who work in state experiment stations and various federal departments.

Mr. Thacker has been keeping rabbits and guinea pigs on diets consisting of whole milk and skim milk powders, plus neces-

sary mineral elements. The animals fail to grow normally, and when they are autopsied, their livers prove to be badly damaged. Substituting dehydrated alfalfa for one-half the diet will prevent the development of cirrhosis. Less than that much alfalfa will enable the animals to grow, but then they will develop liver damage. It thus appears likely that the liver-protecting factor is distinct from the growth factor, but the case is not definitely proven. Thus far, neither factor has been isolated or identified.

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MEDICINE

Two-Front Attack Needed

Medical detectives must discover how the virus is spread and polio detectives must find the means to stop this virus criminal.

► **MEDICAL DETECTIVE WORK** along two fronts is needed for the conquest of infantile paralysis. This is clear from final reports made to the First International Poliomyelitis Conference in New York.

Scientists, thousands strong, are waging a good fight but no one really knows just how many polio viruses exist or what are the characteristics of each of the different strains of the polio virus family.

Within another six months research now under way may bring dramatic proof that some one avenue of germs is the prime means of the spread of the virus from one person to another. Is this avenue of infection an aerial route which the virus rides on the feet of flies? Or does the virus invade the fly's body as it does man's and travel in de luxe style with the fly furnishing food as well as transportation? Answers are coming to these questions, with their hint of a way to stop the spread of polio as yellow fever was stopped by discovery of the mosquito's part in its spread.

But if the answers are "noes," the polio detectives on another front may find the clues to stopping the virus criminal. A method for vaccinating against polio which is on a sounder basis than ever before was reported by Dr. Isabel Morgan of the Johns Hopkins School of Hygiene. Put the vaccine into the muscles, not just under the skin, and give such a big dose that the virus-fighting antibodies spill over from the blood to the central nervous system where the polio virus concentrates. This method will protect monkeys. Will it protect man?

The answers must come partly from the medical detectives who ferret out the secrets of what happens in the human body during the first hours of polio invasion. They must come partly from the polio detectives who trail and identify and characterize the various strains of polio viruses. This part of polio detective work is not as exciting

as it sounds. Dr. John R. Paul of Yale Medical School, one of the foremost polio detectives, calls it "dull" and "uninspiring." But, he said, "if we are to attempt to prepare specific vaccines which might be used to immunize man against this disease, we must clarify the strain situation."

Ferretting out the feeding habits of polio viruses is still another job for the medical detectives. Following this line, Dr. Raymond N. Bieter of the University of Minnesota has discovered chemicals which prevented paralysis or death in 90 out of every 100 mice. The polio virus, Dr. Bieter knew, has a special liking for nerve cells. Maybe, he reasoned, this is because the virus is hungry for some chemical in nerve cells. And if the virus enters the body through the throat and stomach and then goes to the nerves, why not, he wondered, feed it nerve cell chemicals while it is still in the stomach and stop it where it does no damage to human bodies?

It worked in mice. There is a hint that it is working in monkeys. If this proves true, the next step will be to try it in humans. But if it does not work in monkeys, the next step will be to try other chemicals the virus may be hungry for. Dr. Bieter is already on the trail of some of these. When he finds the right one we may have a chemical cure or preventive of polio.

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METEOROLOGY

Air Travel Made Safer by Central Weather Service

► **A CENTRALIZED** weather information bureau, now in full operation in Denver, is making a heavy contribution to both safety and comfort in airplane transportation. It is maintained by United Air Lines and is

located at Stapleton Airfield base.

With the aid of a huge weather wall map, meteorologists of the company review each morning the past weather conditions over the coast-to-coast and Hawaiian routes of the airline, study the present conditions, and make forecasts for the next 24 hours.

Meteorologists at other stations are consulted by telephone, and constant contact is maintained with the Denver U. S. Weather Bureau, whose chief meteorologist prepares special forecasts for the company. Airline weather forecasters along the system are aided in keeping posted on the nation's weather, minute by minute, by the company's 15,000 miles of private teletype lines and 7,600 miles of private telephone circuits. In addition to the centralized service, they keep in touch with the U. S. Weather Bureau and such Army, Air Force or Navy weather stations that may be in the vicinity.

By means of this central information center and the reports received by it the possibilities of conflicting predictions are ruled out. The information permits flight operators to cope with unusual weather problems, by rerouting planes around bad-weather regions or grounding them, and mile-by-mile information radioed to pilots warns them to prepare for, or dodge, bad weather ahead.

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CHEMISTRY

Ammonium Nitrate Safe When Properly Handled

► **SAFETY** in handling ammonium nitrate, the widely-used, white crystalline chemical compound that was behind the recent Texas City disaster, receives indirect consideration in a circular of the U. S. Bureau of Mines. Eighteen fires, serious explosions, and disasters involving ammonium nitrate have occurred since 1896.

The principal wartime use of ammonium nitrate was in explosives. Today's principal use is for fertilizer. Long used in limited quantities for this purpose, its use at the present time has greatly expanded. It can be employed with safety if proper precautions are taken.

The publication was prepared by G. S. Scott and R. L. Grant, chemists of the Pittsburgh office of the Bureau of Mines. Copies may be obtained free from that office. It deals with accidents and disasters, manufacture, preparation as a fertilizer, physical properties of pure ammonium nitrate, decomposition and oxidizing properties, spontaneous heating, and detonation.

The report includes a brief summary of published scientific information on ammonium nitrate and an up-to-date bibliography for reference. The publication states that while chemically pure ammonium nitrate does not decompose spontaneously at ordinary temperatures, it is an oxidizing

agent and, as such, may react with reducing materials, such as carbonaceous matter, certain metals, phosphorus and sulfur. With certain mixtures and the proper environment, spontaneous heating can occur at ordinary temperatures.

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CHEMISTRY

Find Way to Keep Powders Suspended in Liquids

► ELECTRICAL CHARGES on their particles enable certain soapy chemicals called detergents to prevent the curdling of paint, cosmetics and other commercial preparations, the American Chemical Society was told by two California scientists, Leonard Greiner of the U. S. Naval Ordnance Station, Inyokern, and Prof. Robert D. Vold of the University of Southern California, Los Angeles.

Many present-day commercial products, including medicines and toiletries as well as paints, consist of finely divided particles dispersed in liquids. The list of such products would grow, they said, if the factors governing the stability and efficient preparation of dispersions were better known. The investigations on which they reported were to discover the unknown factors.

Powder can be suspended indefinitely in a liquid, they stated, if a suspending agent is added to the mixture. They explained that the agents seem to charge the particles with electricity so that they repel each other. The molecules of the soapy chemicals used split into electrically charged particles when dissolved in water.

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CHEMISTRY

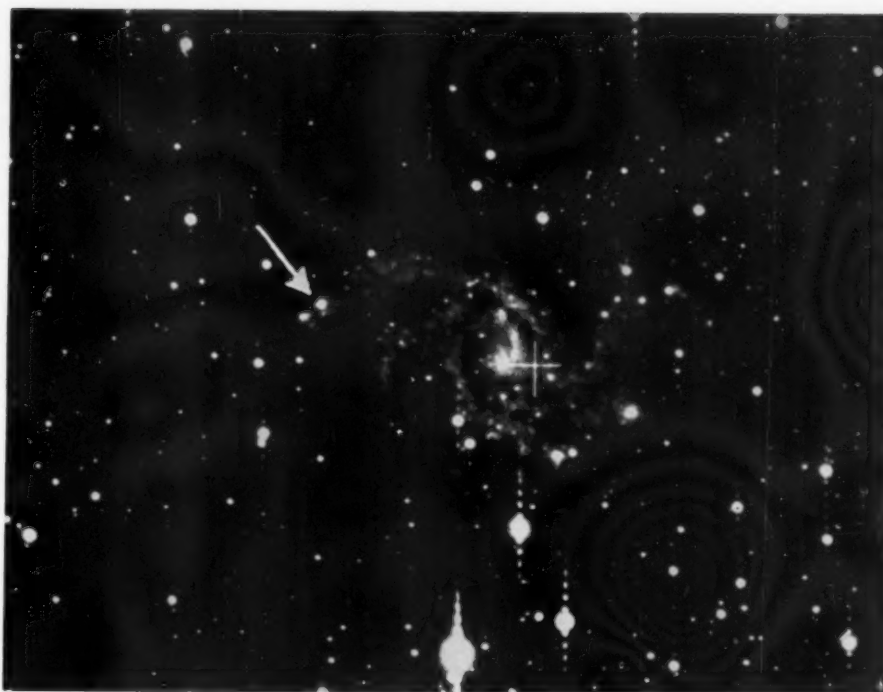
AEC Selling Chemicals In Radioactive Forms

► LATEST peacetime service of the nation's atomic energy program is the sale of chemicals tagged with radioactive elements, announced by the U. S. Atomic Energy Commission.

These chemicals are compounds such as certain acids and alcohols in which one of the elements is radioactive. The radioactive forms, called isotopes, of some chemical elements have been sold to researchers by the Atomic Energy Commission for two years. But the new tagged chemicals will speed studies where the radioactive elements are to be used in compounds.

One of the more important isotopes for research on living things, carbon with atomic weight of 14, is listed by the Commission as available now in several different compounds with more scheduled for production. Radioactive gold in the form of colloidal gold and aurothiosulphate is available for therapeutic use, it was announced.

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EXPLODING STAR—Recently discovered supernova, of the fifteenth magnitude when found, is shown here. Located in a spiral nebula known as NGC 6946, the arrow points to it. The supernova, 4,000,000 light years from the earth, was discovered by Dr. N. U. Mayall of the University of California's Lick Observatory. It was taken with the Carnegie 20-inch astrograph. (See SNL, July 17).

AERONAUTICS

Elasticity of Plane Wings

► THE elasticity of an airplane wing profoundly affects the stability and control of aircraft, the Institute of the Aeronautical Sciences was told at a meeting in Los Angeles, by S. I. Pai and W. R. Sears of Cornell University.

Far from being rigid structures, wings and other components deflect elastically under load, they said. Thus air loads on a wing in flight actually distort the wing, the distortion changing the air loads. The important effects on the ordinary straight wings are due to twisting; with the newer sweepback or sweepforward wings a bending under load changes the air loads appreciably.

Inertia loads, such as weights carried near the tips of the wings, tend to bend the wings downward. This has a stabilizing effect. Fuel tanks on wing tips, already carried on some planes, appear to be advantageous for this reason.

Science News Letter, July 24, 1948

Boundary Layer Control

► BOUNDARY layer control through the use of suction slots in airplane wings was found not "particularly attractive by comparison with drags known to be obtainable

with wings of sufficient smoothness," according to H. B. Dickinson of Lockheed Aircraft Corporation. The use of these suction slots has been recommended by others.

Boundary layers are relatively thin layers of air next to the wings and fuselage of a plane that cause considerable drag. The suction slots on the rear half of the wing surface removes part of the layer and, in theory at least, reduces the drag which comes when the smooth, or laminar flow, breaks into a turbulent flow.

Between 1941 and 1946, an investigation was conducted at Lockheed to determine whether it was advisable to attempt an early application of boundary layer control to an airplane project. The investigation was confined to the use of a single spanwise suction slot on the upper surface of a low-drag airfoil of conventional thickness and planform, Mr. Dickinson stated.

After extensive tests it appears that before the slot method is adopted, the simpler method of obtaining sufficient smoothness of actual wings should be solved. Thereafter, drag reduction by boundary layer control appears less promising, he said, and to make the added complication worthwhile would require capitalizing on all potential advantages.

Science News Letter, July 24, 1948

CHEMISTRY

Police Force of 300 Men In Shirt-Shrinkage Test

► THE entire police force of Springfield, Mass., were, unbeknown to the public, experimental guinea pigs during the past year. They wore woolen shirts treated with a special chemical preparation to prevent shrinkage. Both police and shirts withstood the test.

A report on the shirts, and policeman reaction to them, was made recently by Police Chief Raymond P. Gallagher. He stated that after a year's wear the reaction of his entire force was most complimentary. The 900 shirts tested had been worn in all sorts of weather and subjected to all sorts of laundering both in commercial plants and home washtubs. They should be good for another two years, he said.

This experiment was conducted by the Monsanto Chemical Company of St. Louis and Everett, Mass. The chemical used is known by the trade name of Resloom, and is a melamine resin preparation. Police were selected because of the nature of their duties. The only precaution given the men when the shirts were issued was not to boil them. Individual records made by the officers after each washing show only 33 noted any shrinkage, and these were marked as slight.

Science News Letter, July 24, 1948

VETERINARY MEDICINE

Penicillin Saves Turkeys With Swine Disease Germ

► PENICILLIN has been shown capable of saving turkeys infected with the same germ that causes swine erysipelas, in experiments by Dr. C. G. Grey of the U. S. Department of Agriculture.

He injected doses of 20,000 units of penicillin, suspended in peanut oil, into the wattles of a group of turkeys infected with the swine erysipelas germ, leaving a similarly infected group untreated as controls. All of the controls died, whereas the loss was only 10% in the treated group.

Dr. Grey chose the wattle as the site of the injection because it is not used for food. This is believed to be the first practical use ever found for this curious appendage on the turkey's head.

Science News Letter, July 24, 1948

PSYCHOLOGY

Guinea Pigs Trained to Go into Hypnotic Trances

► GUINEA PIGS can be trained to go into a prolonged hypnotic trance, reports Dr. W. T. Liberson, of the Research Laboratory, Institute of Living, in Hartford, Conn.

The training is very simple. It consists of putting the animal on his back. If he turns over, he is immediately put back on

his back and this is repeated as often as necessary for a two-hour "lesson" each day.

In the hypnotic state the animal lies with paws out, eyes popped out and rolled down and with a fine tremor. At first he may stay in this condition for about half a minute. But after a week of training he may be kept in the same state for two hours without interruption.

Some animals were able to retain their ability to go into a prolonged trance even after three months without further training.

This ability to keep laboratory animals in a prolonged hypnotic state is useful to experimenters on abnormal behavior. It has been difficult to use animals in such experiments previously because hypnotic states in the laboratory animals have previously been very brief and complicated.

Science News Letter, July 24, 1948

GENETICS

Formaldehyde Produces Mutations in Fruit Flies

► FORMALDEHYDE, familiar through its uses as disinfectant, preservative and embalming fluid, is able in low concentration to produce mutations, or sudden evolutionary changes, through its effects on the hereditary characters carried by the chromosomes within cell nuclei.

Experiments demonstrating this were carried out on fruit flies in the laboratories of the University of California, by William D. Kaplan, who reports his results in *Science* (July 9). Mr. Kaplan's results support and confirm earlier researches along the same line conducted in the USSR by a Russian investigator, I. A. Rapoport.

The mutations produced in both series of experiments were of the type known as lethal; that is, the individuals in which they occurred all failed to live.

Science News Letter, July 24, 1948

GENERAL SCIENCE

Proposed Measures Would Decrease Trade Barriers

► DECREASED barriers to international trade are expected from international standards for textiles and textile test methods proposed at Buxton, England, at a meeting of representatives of 13 nations. Countries included, besides those of western Europe, are Australia, New Zealand, India, the Soviet Union and the United States.

United States participation is through the American Standards Association. The American delegation was composed of 12 men representing the association, the National Bureau of Standards, and other organizations concerned with textile studies or manufacture. Important steps were taken to organize the standards, but further studies must be made by special committees. Americans will head two of these committees.

Science News Letter, July 24, 1948

IN SCIENCE

ENGINEERING-AERONAUTICS

Floating Drydock to Hold Largest Flying Boats

► TESTING an experimental floating drydock for the Navy's largest flying boats has been completed in Port Hueneme, Calif., and the dock pronounced a success, it was revealed. The floating drydock is designed to permit repair work on giant seaplanes without hoisting them aboard seaplane tenders.

The drydock consists of four pontoon strings connected side by side, each 18 pontoons long, on which wingwalls are imposed, and has a timbered deck. It is equipped with three water jets on each wall to assist in warping the seaplane into place by throwing water pressure against the sides of its hull.

Under present plans, an LSD (Landing Ship, Dock) will serve as a tender for the floating drydock. This type of vessel was built to serve as a parent ship to landing craft and to coastal craft. It is large enough to receive in its well deck the drydock with cradled seaplane for maintenance. The drydock is 103 feet long and nearly 40 feet wide. The LSD will carry it from place to place where needed.

Science News Letter, July 24, 1948

NUCLEAR PHYSICS

Glasgow Is New Center of British Nuclear Research

► WITH the British Government's decision to build a new 300,000,000-electron volt synchrotron at Glasgow University, Glasgow has become an important center of nuclear research in the British Empire.

Research has been going on there for some time using a 30,000,000-electron volt synchrotron which was built in 1946 and is the world's first machine of this kind. It has been used for industrial and medical research work, but scientists have been limited by the comparatively small scope of the machine.

The new 150-ton synchrotron is being constructed by Metropolitan Vickers in association with the Ministry of Supply's Atomic Energy Research Establishment and the University of Glasgow. The machine is to be used for fundamental research in nuclear physics and medical research in the field of X-rays.

Large-scale synchrotrons now being built in the United States include the 3,000,000,000-electron volt atom-smasher which the Brookhaven National Laboratory at Upton, Long Island, N. Y., expects to finish in three years.

Science News Letter, July 24, 1948

WIDE FIELDS

MARINE BIOLOGY

Color Photos of Life in Ocean To Be Attempted

► COLOR photographs of life in the ocean at two miles straight down will be attempted by this year's expedition of the research ship *Atlantis*, which left Woods Hole, Mass., July 15. Leader of the oceanographic group aboard is Dr. Maurice Ewing of Columbia University.

To produce light enough to make color pictures in the everlasting darkness of great ocean depths, powerful flashlamps will be used, with specially built transparent covers to protect them against the crushing pressure. Black-and-white pictures will be made at depths even greater than the two-mile limit set for the present on the color cameras.

Other research objectives include further mapping of the Midatlantic Ridge, the great submerged mountain chain that runs down almost the whole length of the Atlantic, the collection of 60-foot cores of its surface materials with a long sampling tube, and collection of bottom life with special deep-water trawls and dredges.

The expedition is sponsored jointly by Columbia University, the Woods Hole Oceanographic Institution and the National Geographic Society.

Science News Letter, July 24, 1948

PLANT PATHOLOGY

Elm Disease Outbreak In Denver Confirmed

► DUTCH ELM disease, deadliest enemy of the favorite American shade tree, is now known to exist far to the west of Ohio, long thought to be its western limit. Very recently an outbreak in Denver, reported by Colorado state entomologists, was investigated and confirmed as the true elm disease by workers of the U. S. Bureau of Entomology and Plant Quarantine. The destructive fungus has been attacking elms in several places in Ohio, and at least one spot outbreak in Indianapolis, Ind., is known to have occurred.

Entomologists in Washington are disturbed over their lack of information about possible outbreaks between the Ohio-Indiana area and the Rocky Mountains, for elms are valued shade trees throughout the Midwest. Lack of funds has forced them to curtail survey work formerly carried on in zones around the area of known infestation.

The fungus that causes the disease is carried by a bark-burrowing beetle that is known to be sensitive to DDT. Spraying with this insecticide therefore is recommended for the protection of trees suffi-

ciently valuable to justify the cost. Two sprayings are commonly applied: one before the leaves develop, to get the beetles as they attack the bark on the twigs; the other in July, which kills leaf-eating insects and caterpillars as well as any beetles that may be about at the time.

Dutch elm disease, incidentally, is a misnomer. It came to this country from Europe, but definitely not from the Netherlands.

Science News Letter, July 24, 1948

AERONAUTICS

Unconventional Flight Control System Abandoned

► A NEW, simplified but unconventional flight control system for British private planes has been abandoned because it is unacceptable to a number of light-plane pilots. Their principal objection appears to be that it does not employ the familiar normal method of stick and rudder pedals.

The system, already officially approved by the British Air Registration Board, was intended to be standard equipment on the Chrislea Super Ace light personal plane. The majority of the pilots who gave it a trial agreed that it was admirably suited for private flying, club flying and for planes carrying light loads, but they preferred the familiar type of controls.

The control in this new system was a single wheel, resembling a car's steering wheel mounted on a short column projecting from the instrument panel. With this system, the wheel is rotated in the direction of the required bank. For climbing or diving, the wheel is lowered or raised. To turn the plane's nose left or right, the wheel is swung left or right. A Chrislea test pilot pronounces the system as practical once the unusual movements become familiar.

Science News Letter, July 24, 1948

ENGINEERING

New Device Measures And Records Vibrations

► VIBRATIONS in a building or in a machine, too minor to be noted by ordinary means, are measured and recorded by a new device small enough to hold in the hand, General Electric revealed. It is called a recording vibrometer.

A short metal prod which projects from one side of loaf-of-bread-sized vibrometer is held against the vibrating object. Inside the instrument's case, a moving sapphire point rests on moving waxed-paper tape. Vibrations are transmitted through the prod, magnified 12 times by a spring, and passed on to the moving point, which records on the tape both frequency and magnitude of vibration.

The tape is moved forward by a constant speed motor. A time mark is made on the tape every three seconds.

Science News Letter, July 24, 1948

ENGINEERING-AERONAUTICS

British Airport Lighting Claimed as Major Advance

► A NEW TYPE of airfield approach lighting, claimed to be a considerable advance on any system previously devised anywhere in the world, is to be installed at London Airport this year. It is a system for use in foggy weather or at night which will give pilots a horizon at which to aim in landing.

The system consists of bars of lights placed horizontally across the approach area at intervals of 600 feet, with a central line of lights 100 feet apart leading straight to the runway. As the pilot approaches the runway, the bars of light provide him with an artificially created horizon by which he can gauge his distance from the ground. The central lights guide him to the runway.

It is expected that the use of this lighting system will permit daytime landings when visibility is restricted to 200 yards, and nighttime landings when visibility is down to 100 yards. The system was designed at the Royal Aircraft Establishment at Farnborough, where it has been installed experimentally at the airport.

Science News Letter, July 24, 1948

PLANT PHYSIOLOGY

"Pepping-Up" Methods Don't Add Vitamin C to Greens

► A "MESS O' GREENS" from a normally fertile, adequately watered garden will contain all the ascorbic acid, or vitamin C, it is capable of developing. Its content cannot be increased by forced feeding with fertilizers or any other "pepping-up" methods, it was indicated in experiments reported by Dr. G. Fred Somers of the U. S. Plant, Soil and Nutrition Laboratory at the seventh annual meeting of the Laboratory's collaborators in Ithaca, N. Y.

The tests were made by the most delicate and exact of plant physiological methods, with leaf samples of equal area cut from turnip and broccoli leaves of uniform size and age. These were subjected to various chemical and physical conditions and then analyzed for their ascorbic acid content.

Preliminary experiments showed that basic needs of leaf cells for forming the vitamin are the same as those for formation of carbohydrate food: sunlight, moisture, carbon dioxide and the right temperature. Given these, the leaf material doesn't seem to mind what else it gets.

Extra doses of fertilizer salt, of certain sugars, of hormones or growth control substances, even some poisons, either fail to speed up the vitamin production or actually depress it. The sole exception is potassium nitrate, which at some low concentrations increases production to a certain extent. Otherwise, the leaf samples get along best on plain water.

Science News Letter, July 24, 1948

ASTRONOMY

Meteors More Numerous

Perseid "shooting stars" will be seen at their best late on the night of Aug. 12 because the moon will set about midnight, having just passed first quarter.

By JAMES STOKLEY

► WHILE on any clear, dark night one may see a brilliant shooting star, or meteor, there are some times of year when these bits of cosmic dust that enter the earth's atmosphere from outer space are much more numerous. The early part of August is such a time, especially about the twelfth. But often the moon is then so bright that the meteors are overwhelmed in its glare. This year, however, the moon is new on Aug. 4 and is just past first quarter on the twelfth, which means that it sets about midnight. Since the meteors are most frequent in the early morning hours, the moon will be out of the way for those who want to observe them.

On the accompanying maps (which show the appearance of the skies about 11:00 p. m., daylight saving time, on Aug. 1, and an hour earlier the middle of the month) the constellation of Perseus is seen low in the northeast. This is the part of the sky from which the August meteors seem to emerge, and hence they are called the Perseid meteor shower. Late on the night of Aug. 12, these will come at about the rate of one a minute, but even earlier they will appear more often than usual.

Jupiter Brightest

The brightest planet to be seen these August evenings is Jupiter, now in the constellation of Ophiuchus, the serpent-bearer, near the bright and ruddy star Antares, which is in the neighboring constellation of Scorpius, the scorpion. In the south as the sun sets, Jupiter remains plainly visible throughout the evening. Another planet can be seen farther west, in the constellation of Virgo, the virgin, though it is much fainter. This is Mars, which sets about two hours after the sun. The cause of its faintness is its great distance. Last Feb. 17 it was shining brilliantly in the evening sky, for then it was only 62,950,000 miles from us. Now it has swung around to the far side of the sun and, on Aug. 1, its distance is 167,410,000 miles.

As for the other planets, both Mercury and Saturn are invisible in August because they are so nearly in line with the sun. Venus, however, shines brilliantly in the early morning sky, about seven times as bright as Jupiter. It rises in the east several hours before the sun.

Brightest of the stars of the August evening is Vega, almost directly overhead, in the constellation of Lyra, the lyre. Second is Arcturus, in Bootes, the bear driver, half

way up in the western sky. Then comes red Antares, in Scorpius, low in the south, which is followed by Deneb, in Cygnus, the swan, high in the east. Last of the first-magnitude stars seen these evenings is Altair, in Aquila, the eagle, high in the south.

Though several comets discovered by astronomers in recent months are now in various parts of the sky, none of them has become a conspicuous object to the naked eye. It has been nearly 40 years since a really spectacular comet has been visible, a period somewhat longer than the average over recent centuries, so perhaps it may not be long before we have another. Such comets usually have such long periods, of thousands of years, that we have no accurate records of their past appearance, and thus they cannot be predicted.

Perseid Meteors

Sometimes, however, a comet ceases to appear as such, but continues in the ghostly form exemplified by the Perseid meteors that reach their height about Aug. 12. The reason that we see these every year about the same time is due to the fact that they are moving about the sun in a long, elliptical orbit, which happens to intersect that of the earth at the position we occupy in early August. Naturally, therefore, we cannot see them at other times, though there are other meteor swarms, which we pass, for example, in April, November and December.

Thus, when these fast moving particles become visible as they are heated by their encounter with the earth's atmosphere, the paths of light which they make seem to converge in the distance. This is an effect

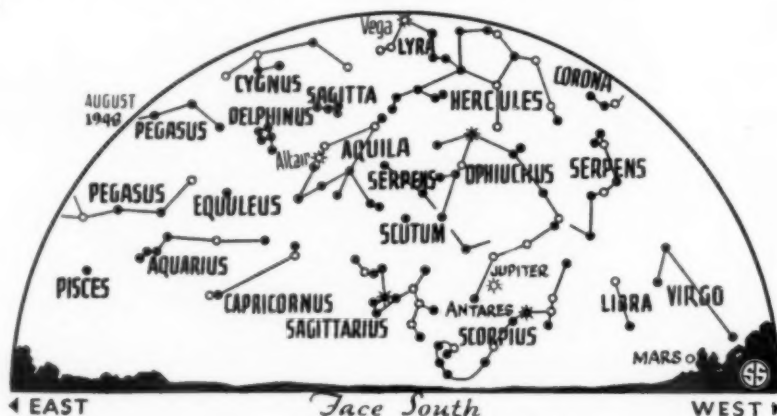
of perspective, just the same as that which makes the parallel tracks of a railroad seem to come together toward the horizon.

The Perseid meteors had long been observed by the year 1866, when the Italian astronomer, Giovanni Schiaparelli, was studying the orbit of a comet that had appeared a few years before, in 1862. This had been barely visible to the unaided eye, not at all spectacular. He found, however, that its orbit was practically the same as that in which the Perseid meteor swarm travelled. This, together with later discoveries of the identity of the orbits of other comets and meteor swarms, made it evident that the showers are the debris of the comets.

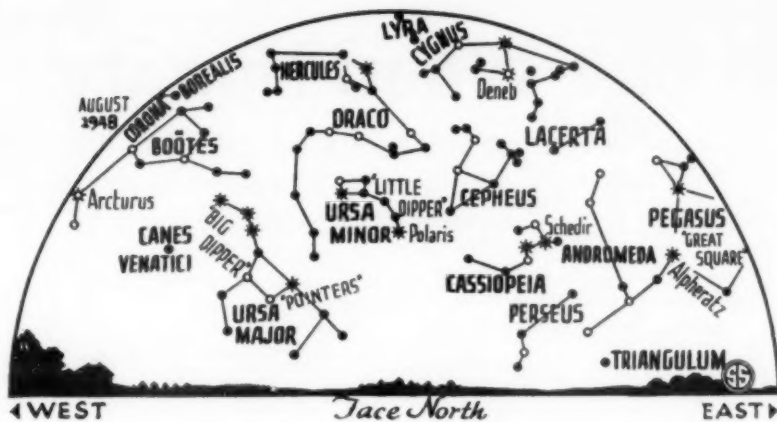
Leonid Shower

In some cases the meteors are concentrated at one point. This is true of the ones that we see in November, called the Leonids. Though two of the greatest showers on record were Leonids, in recent years they have been quite sparse. The Perseids, however, are very consistent, which indicates that they are quite uniformly distributed throughout their orbit.

The observation of meteors is one field in which amateurs can be of considerable assistance to the professionals. Astronomers who study meteors are anxious to get as full reports as possible of the numbers in the showers. The simplest sort of observation is simply a count of the total numbers during half-hourly periods, say from 11:00 to 11:30, 11:30 to midnight, and so on. Several people may cooperate in such counts, each taking one part of the sky. The numbers recorded may be sent in to Dr. C. P. Olivier, Director of the Flower Observatory of the University of Pennsylvania, at Upper Darby, Pa. This observatory is one of the principal centers of meteor study.



* * * * SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



In addition to the numbers of meteors, a statement of the location, cloud conditions, names of observers, etc., should be reported. If any unusually bright meteors appear, their path among the stars should be reported, as accurately as possible. From such data, obtained at scattered locations, the real path of the meteor in the sky may be calculated.

Observers are often fooled into thinking that a meteor falls much more closely than it does. Some years ago, when I was connected with a museum in Philadelphia, a very brilliant meteor, or "fireball," flashed over the city, toward the northeast, in the early morning hours. The next day I received a phone call from a taxi driver. He said he had been returning home just as it appeared, and that it landed in the field near his house. If we wanted it, he would get it for us. Though doubting that it was so close, I assured him we would be delighted to have it. A few days later he

called again, to say that he still had not found it, but expected to do so soon, and he would keep on hunting. We never heard any more from him. This was hardly surprising, since astronomical calculations, made on the basis of reports from a number of northeastern states, showed that it had passed over Connecticut, and had fallen in the sea several hundred miles east of Massachusetts!

Time Table for August

Aug.	EDST	
2	1:28 a. m.	Moon passes Venus
5	12:13 a. m.	New moon
	4:00 p. m.	Moon nearest, distance 222,400 miles
9	12:46 a. m.	Moon passes Mars
11	3:40 p. m.	Moon in first quarter
12-13	after midnight	Perseid meteors
14	12:24 a. m.	Moon passes Jupiter
19	1:32 p. m.	Full moon
20	5:00 a. m.	Moon farthest; distance 252,600 miles
27	2:46 p. m.	Moon in last quarter
30	11:15 p. m.	Moon passes Venus

Subtract one hour for CDST, two hours for MDST, and three for PDST.

Science News Letter, July 24, 1948

AGRICULTURE

Chinese Re-Plant Willows

► CHINESE capacity for self-help, and therewith China's chances for getting "off relief" on a world-burdening scale, are being tested on a small but encouraging scale on the island of Pa Kua Chou, in the Yangtze river about six miles downstream from the city of Nanking.

A population of about 10,000, mostly farmers, support themselves on the island, which has approximately 10,500 acres of farmland and some 1,200 acres of swamp. They would probably never have needed to ask help from anyone, but for a crisis produced by the war.

When the Japs moved into this part of China, they cut the island off completely, forcing the inhabitants to use up for fuel the willow-trees that had formerly lined its dykes and shores. This had two disastrous effects: the islanders could no longer weave baskets, and rapid erosion began to rob them of their soil.

To set the people of Pa Kua Chou back on their feet again, a cooperative project

for planting more than 2,000,000 willow cuttings was undertaken by a group of Chinese and foreign agencies, including the Extension Commission, the National Forestry Research Bureau, the China Relief Mission and the Food and Agriculture Organization of the United Nations.

The cuttings were made from willows elsewhere along the river, the work being done by refugee labor paid for by the China Relief Mission.

From here on, however, the islanders took over. As most of the cuttings were brought to Pa Kua Chou, they became the property of the farmers, who planted them on their own land. Some of the cuttings, planted on public lands, became public property and will be administered by a committee representing the cooperating agencies and the farmers' organizations. The farmers have agreed among themselves not to indulge in premature cutting.

FAO experts, who have served as advisers throughout the project, estimate that at

least 90% of the cuttings will live. In a few months, erosion will be checked, and there will be at least a little fuel available for winter use. However, withes suitable for basket-weaving will not be ready before the spring of 1950.

From here the farmers have made further advances on their own. On petition to the Nanking municipal government, they have obtained ten tractors and a considerable number of modern farm machines, as well as four large power pumps. These are to take the place of farm animals, formerly rented from the mainland at considerable cost. The farmers have organized a cooperative to take title to the machinery for the community, and to pay off the loan with which it was purchased. They will also have to face the problem of buying fuel and oil to keep their machinery running.

The experiment is proving the ability of the Chinese farmers to improve their lot by cooperation, as well as the value of joint effort on the part of government and private organizations. Most important of all, if the experiment succeeds it will serve as a model to be followed elsewhere in China's big job of getting out of the hole.

Science News Letter, July 24, 1948

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Do You Know?

Shadetree trunks are sometimes split open by excessively low temperature.

Some gelatin for food and emulsions is made from pigskins.

Color, according to some scientists, definitely possesses properties that make people feel warm or cold, happy or depressed.

The normal time for an iceberg to travel from the West Greenland glaciers to the steamer lanes south of Newfoundland is about two and one-half years.

Babies are born calcium-poor because their bones must be soft to permit passage into the outside world; after birth they need calcium-rich food, such as milk, to give strength to their bones so that they will develop normally.

A radio-controlled lightship, now about ready for testing in a Maryland bay, carries no permanent crew; the vessel's light, fog signal and radiobeacon will be controlled by radio from a shore station.

The highest mountain peak on each of the five principal continents is Everest in Asia, Aconcagua in South America, McKinley in North America, Kilimanjaro in Africa and Mont Blanc in Europe; they are listed in order of their heights.

CHEMISTRY

Chemicals Cut Swelling Of Wood from Moisture

► WOOD in window sash and bureau drawers can be protected from swelling in humid weather and shrinkage in dry periods by recently developed chemical treatments, the American Chemical Society was told at a meeting in Cambridge, Mass., by Dr. Alfred J. Stamm and Dr. Harold Tarkow of the U. S. Forest Products Laboratory, Madison, Wis.

Wood in its natural state contains a relatively large amount of empty space, chiefly in the form of fiber cavities and pores. Introduction of synthetic resins, or plastics, of the phenol-formaldehyde or urea-formaldehyde types within the cell wall structure provides bulk for the fiber walls and minimizes both swelling and shrinkage, they said.

Treating wood with a compound called acetic anhydride, a distant relative of vinegar, also bulks the fiber and reduces shrinking and swelling by altering the basic molecular structure. A type of wax that is insoluble in water may be used but the process of getting the wax inside the cell walls is complicated. Sugar and certain salts give satisfactory temporary results, but they wash out of the wood rather easily.

Science News Letter, July 24, 1948

ICHTHYOLOGY

Fish Bite When Hungry

Anger or hunger will make fish bite, but when they are full they will take no more for 24 hours. Their appetites vary from day to day, season to season.

► TO BITE, a fish must either be angry or hungry.

So says Dr. Samuel Eddy of the University of Minnesota zoology department and thus he concisely sums up the question pondering anglers for centuries.

Hunger is the main reason fish bite. Normally they start feeding early, spend the middle of the day digesting their catch and then toward evening may look around for a bedtime snack. When they are full they will take no more for 24 hours. Large fish work the hardest and longest getting their fill.

Fish appetites vary from day to day and season to season. Temperature is one factor. Fish are always hungry after spawning.

Last summer's poor fishing in many of the northern states was not due to overfishing or insufficient stocking but to abundant natural food. Instead of highly specialized diets, most fish will take whatever is available, including plants. Many eat their own young. Frogs actually are a small part of bass diet. Northerns and muskies will take almost any swimming animal they can swallow.

Most game fish locate food by sight, which is poor, otherwise they would not strike bits of wood and even pebbles. Motion is more important than details of lure structure.

Fish such as catfish, suckers and carp have well-developed senses of taste and others such as crappies, sunfish and rock bass seem to use a combination of taste and sight.

Some fish travel in schools and when one is caught there should be more. Northern pike tend to travel alone. Only artificial baits that give plenty of action should be considered.

Fishing is mainly an attempt to fool the fish into thinking a lure is something to eat. When the fish is not hungry all the art and cunning may not avail. Again, the biggest fish in the lake may pass up your luscious lure and take the worm offered by your small son at the other end of the boat.

When we cannot explain the fishes' behavior we call it luck. No doubt luck still plays an important part. If it were not for the element of luck, of the chance that you might catch the biggest fish of your life, much of the attraction would be removed.

Inventors of various devices to simplify the knack of catching fish, including calendars, almanacs, barometers and tables of moon phases and tides, probably will be unhappy about Dr. Eddy's conclusions. He implies that all this magic is refinement of

superstitions, conjured up by anglers of prehistoric times.

"Ever since prehistoric man invented the fish-hook," Dr. Eddy declares, "fishermen have tried all sorts of schemes to make fish bite it. Man soon found that sometimes he caught lots of fish and again he caught very few, and for thousands of years he has been trying to figure out why."

"First he blamed the spirits, then he figured moon phases probably were responsible, and even today you can still obtain almanacs and calendars (made out a year in advance) which tell you the days fish will bite."

As for the barometer, Dr. Eddy points out that a fish swimming a few feet up or down will encounter far greater pressure changes than normal atmosphere fluctuations. The fish has in his body a sort of barometer—an air bladder for buoyancy which is sensitive to pressure.

"So the real reason a fish bites," the fish expert asserts, "is because the fish is either hungry or mad."

Science News Letter, July 24, 1948

GENERAL SCIENCE

New German Science Group Honors Max Planck

► GERMAN SCIENTISTS have organized a new group, the Max Planck Society for the Advancement of Science, to replace the war-ruined Kaiser Wilhelm Society. Its first meeting was held recently at Goettingen in the British Zone, famous for the university where much of the physical and mathematical research that eventually led to the development of atomic energy took place.

Prof. Max Planck, for whom the society is named, in 1918 received the Nobel Prize in physics for his development of the quantum theory, which is basic to much of later development in theoretical physics, especially in the field of light. He died at an advanced age in 1947.

The Max Planck Society is expected to operate throughout Bizonia, and is open to the adherence of all research institutes and other organizations who choose to become affiliated. It guarantees unfettered freedom of research to all component institutes, subject only to the Control Council's regulations on scientific research. It is expected that about 25 organizations, formerly members of the Kaiser Wilhelm Society, will join.

The well-endowed Kaiser Wilhelm Society was organized in 1911, and at the outset was scrupulously kept free of all

political control. However, during the Hitler regime it became so infiltrated with Nazism that after the war the four-power Allied Control Authority decided to dissolve it. Although this dissolution was never actually carried out, it seemed better to organize a replacement society as a nucleus for free research by German workers in scientific fields than to leave matters in a suspended and uncertain state.

Science News Letter, July 24, 1948

AERONAUTICS

Safer Rough-Water Hulls Promised for Flying Ships

► **BETTER** hulls for flying boats, particularly for landings and take-offs in rough water, are promised. They will have long, narrow bodies with curved noses and lengthened afterbodies, the Institute of the Aeronautical Sciences was told at a meeting in Los Angeles, by A. W. Carter, National Advisory Committee for Aeronautics, Langley Field, Va.

A series of related seaplane hulls having a wide variation in length-beam ratio have been investigated at the Langley laboratories, he said. It was found that an increase in hull length-beam ratio from six to 15 reduced the aerodynamic drag without appreciably affecting the hydrodynamic qualities in smooth water, reduced vertical accelerations and motions during landings in rough water, and reduced the structural weight required for a given load factor.

Practical tests of various hulls are now underway, conducted by the U. S. Navy. An amphibian plane has been so modified that interchangeable hulls may be used on it. The hulls can be removed and replaced easily by use of bolts. The first hull undergoing tests is the elongated type now on the new Navy Martin XP5M-1 patrol plane. The most striking feature of this is its so-called afterbody that extends to the extreme end of the plane. Two hulls designed by the National Advisory Committee for Aeronautics, both what are called planing-tail types, will be tested on the same flying boat.

Science News Letter, July 24, 1948

INVENTION

Stool Perch for Barbers Has Already Been Invented

► **RECENT PROPOSALS** that barbers and dentists should have stools on which to perch while they work seem to have been just a trifle late: the thing has already been invented. U. S. patent 2,445,000 has just been issued to Charles E. Paden of Pittsburgh, on an adjustable stool that rides on casters around the chair, to which it is attached by a pair of metal arms. The user can vary his distance, height and angle of operations at will.

Science News Letter, July 24, 1948

ENGINEERING

Roofs Supported on Air

This type of construction would be advantageous for medium-sized buildings, eliminating such obstructions as columns, trusses and beams.

► **ROOFS** of some future buildings will be supported on air, literally.

For medium to large one-story buildings, support of the roof by inside air pressure without trusses, interior bearing walls or columns seems practical. It is one way to decrease present high building construction costs.

The idea is not just an engineer's dream; it has had a successful tryout.

A grain-storage building was erected in Minneapolis in 1934. It was a structure with half-cylinder ends 50 feet in diameter, the over-all length of the building being 250 feet. The one-piece roof, of welded galvanized steel, attached with an air-tight joint at its edges along the outside wall, was satisfactorily supported by an air pressure of eight ounces supplied by ventilating fans. The building was dismantled at the end of a year because of the explosion hazard existing where grain dust is held in suspension.

Roofs supported by air pressure were given serious consideration during the war and tests were conducted at New York University for the U. S. War Production Board in 1944. Herbert H. Stevens, Jr., of New York, who is an authority on this type of construction, describes the roof as of circular or elliptical shape, made of thin, ductile sheet material. The enclosure formed by the roof, the floor and side-walls would be relatively air-tight. Air forced into the structure by ordinary ventilating fans raises and stretches the roof into a shallow dome shape.

"The air pressure would be reduced from about four ounces per square inch, needed to stretch the roof, to about one ounce per square inch which would be thereafter permanently required to support the roof, insulation, roofing, and such structures as lights, fireproofing and sprinkler system hung from the underside of the roof," he states. "About half of this pressure would be in excess of the total roof load and would serve to induce biaxial tensions throughout the roof membrane to resist depressing and oscillating effects of the wind."

The pressure could be maintained by continuous operation of only a small part of the ventilating system. Standby power would be required in case of interruption in the ordinary power supply. In case of extra load on the roof, as from snow, the inside air pressure would be increased automatically or otherwise. About one and one-third ounces of increased pressure would balance a one-foot load of snow.

The pressure required to support the roof would have negligible physiological effects on occupants of the building. Air locks to

retain the pressure need be little more than double-doored vestibules or revolving doors for people.

The merits of this type of construction lie chiefly in medium to large one-story buildings, according to Mr. Stevens. The method of roof support eliminates a great deal of the foundation structures, columns, trusses and beams found in ordinary buildings. Again, the interior is completely free of structural obstructions. A roof of 0.109 inches thick aluminum alloy could be used for spans of 900 feet, he declares.

A British patent has recently been allowed to Mr. Stevens for a roof supported by inside air pressure. An American patent, 2,079,461, was awarded to J. H. MacMillan, Jr., some years ago for similar construction. A report on the investigations at New York University was issued in 1944.

Science News Letter, July 24, 1948

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BIOCHEMISTRY

New B Vitamin Discovery

There is hope that it may have an anti-anemia effect, although at present only the mealworm has been found to need this new vitamin, christened B_T.

► DISCOVERY of a new B vitamin which may turn out to have an anti-anemia effect is announced by Dr. G. Fraenkel, of the Imperial College of Science and Technology, in the scientific journal, *Nature* (June 19).

The vitamin has been christened B_T, the letter T standing for the scientific name for the mealworm, *Tenebrio molitor*.

The mealworm needs vitamin B_T, in addition to at least eight previously known B vitamins and folic acid, for its growth and survival. Whether humans and other

animals or other insects need the new vitamin is not yet known. But Dr. Fraenkel points out that "there has scarcely been a case of a new B factor (vitamin) which was not ultimately proved to be of general significance."

Mealworms, he adds, react very sensitively to being deprived of folic acid as well as to lack of the new B vitamin. They may therefore be valuable for studying anemia where the lack of a convenient testing organism has always hampered progress.

Science News Letter, July 24, 1948

ZOOLOGY

Smallest Possible Mammal

► THE SMALLEST possible adult mammal (not known to exist) would weigh about one-twelfth of an ounce, or two and one-half grams. Any warm-blooded furbearer smaller than that could not eat fast enough to keep its body fires going, calculates Oliver P. Pearson, zoologist at the University of California.

Mr. Pearson bases his figures on measurements of the metabolism rates of shrews, the smallest of known mammals, which burn up their body-fuels faster than any of their larger distant relatives. The smallest of the shrews he studied, weighing 4.5 grams, had a metabolic rate more than twice as high, weight for weight, as a

field-mouse more than twice its size.

It has long been known that the larger a warm-blooded animal the more slowly its body-fires burn. Shrews, which look like midget mice but are not rodents at all, are fiercely carnivorous, devouring insects, mice and each other. They have to eat practically all the time; if they are kept without food for even a few hours they die.

The body weight at which food intake would just balance its utilization in the animal's life-processes works out, on the curves projected by Mr. Pearson, as near 2.5 grams.

Mr. Pearson offers his results in *Science* (July 9).

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CHEMISTRY

Products from Plastic

► SUITCASES and trunks, cabinets and trays are molded from one of science's newest plastic products—cellulose acetate laminate.

Several layers of resin-treated fabric are sandwiched between sheets of clear plastic to form a compact layer. As the weave and printed pattern of the fabric show through the transparent layers, a wide variety of designs is possible.

The fabric gives the laminated product its great strength and interesting appearance; the plastic protects it from being soiled or stained. Corners can be molded so they are well-rounded and water-proof.

Ten thousand kits containing samples of this laminate and other cellulose plastics are being distributed throughout the world to people interested in science. The kits were prepared by SCIENCE SERVICE with the cooperation of some of the coun-

try's outstanding producers of cellulose plastics.

Cellulose propionate, one of the newest cellulosic plastics, is used for optical frames and fountain pens. Pellets of cellulose propionate not only show the material ready to be molded, but also enable those receiving the kit to do a bit of molding on their own.

The pellets are merely heated on the stove and poured into a simple mold. Consisting of two pieces that fit snugly together, such a mold can easily be carved from bits of wood. The crude plastic article an amateur produces on his first try gives a rough idea of the molding process, but is a far cry from professionally formed articles such as the whistle included in the kit.

Short cotton fibers left on the seed after the first ginning are one of the chief sources of cellulose, basic material for cellulose

plastics. This blotter-like material is included in the kit along with cellulose acetate flake, pellets of cellulose acetate butyrate and a molded chip of ethyl cellulose.

The Cellulose Plastics Unit of THINGS of science, containing these specimens and museum labels for their display, as well as suggesting a number of experiments, may be secured by sending 50c to Science Service, 1719 N St., N. W., Washington 6, D. C., and asking for unit No. 93.

Science News Letter, July 24, 1948

METEOROLOGY

Automatic Electric Device Makes Own Wind Record

► THE WIND will make its own records on a portable electric device which can be left unattended in isolated places a month at a time, the Army Signal Corps revealed. In size it is slightly larger than an infantryman's pack.

The instrument makes a continuous record of wind directions and wind velocity on a moving roll of paper, which is long enough to make an 800-hour recording. It uses no ink. Records are made by electric spark holes through the paper.

This electric weatherman was developed for the Signal Corps by the General Electric Company, Schenectady, N. Y. Moving arms, connected electrically to a conventional anemometer, a wind velocity-measuring instrument, and to a weather vane, mark specially-sensitized paper by sending sparks through it. The instrument can register wind velocities up to 150 miles per hour and direction within 1.5 degrees.

Science News Letter, July 24, 1948

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CANCER: Volume 1, Number 1—Fred W. Stewart—*Hoeber*, 176 p., illus., monthly, \$8.00 a year, \$2.50 a single copy. A new journal dealing primarily with human cancer and experimental work which has a relationship, even though remote, to human cancer. Excellent illustrations.

COLOR PHOTOGRAPHY FOR THE AMATEUR—Keith Henney—*McGraw-Hill*, rev. ed., 355 p., illus., \$5.00. All methods of making transparencies and color prints are treated largely from the author's own experience.

FAILURES IN PSYCHIATRIC TREATMENT—Paul H. Hoch, Ed.—*Grune & Stratton*, 241 p., illus., \$4.50. Papers presented before the American Psychopathological Association by distinguished scientists who discuss the shortcomings of various branches of the field.

THE FEEDING AND RELATED BEHAVIOR OF HUMMINGBIRDS—Frank Benc—*Branford*, 112 p., illus., \$2.50. A study of the hummingbirds that nested in the author's garden.

HOW TO PREDICT ELECTIONS—Louis H. Bean—*Knopf*, 196 p., \$2.50. A timely book telling why polls go right and wrong, the power of third parties, and how to read the meaning of political straws in the wind.

ISLAND LIFE: A Study of the Land Vertebrates of the Islands of Eastern Lake Michigan—Robert T. Hatt and others—*Cranbrook Institute of Science*, 179 p., illus., \$4.00. The fauna of islands interests naturalists because segregation speeds differentiation and often alters the habits of species.

LIMNOLOGICAL METHODS—Paul S. Welch—*Blakiston*, 381 p., illus., \$7.00. Providing a single source of information about the meth-

ods of study of life in fresh water, ordinarily scattered throughout the literature of other sciences.

LOVEJOY'S COMPLETE GUIDE TO AMERICAN COLLEGES AND UNIVERSITIES—Clarence E. Lovejoy—*Simon and Schuster*, 158 p., paper, \$1.50. Information for those planning to go to college. Supplanting an earlier book, "So You're Going to College."

OUR AMERICAN LAND: The Story of Its Abuse and Its Conservation—Hugh H. Bennett—*Govt. Printing Office*, 31 p., illus., paper, 10 cents.

PROGRESS IN NEUROLOGY AND PSYCHIATRY: An Annual Review, Volume III—E. A. Spiegel—*Grune & Stratton*, 661 p., \$10.00. This volume reviews more than 2,800 papers on basic sciences, neurology, neurosurgery and psychiatry.

A REAPPRAISAL OF PERUVIAN ARCHAEOLOGY—Wendell C. Bennett, Ed.—*Society for American Archaeology and the Institute of Andean Research*, 128 p., illus., paper, \$2.00. Formal papers presented at a conference on Peruvian archaeology.

THE STORY OF OUR TIME: Encyclopedia Yearbook, 1948—*Grollier Society*, 431 p., illus., \$7.50. The story of an important year told in text and photographs. Includes much on science.

UNDERWATER EXPLOSIONS—Robert H. Cole—*Princeton University Press*, 437 p., illus., \$7.50. Interesting to those concerned with the effect of explosions and also because of the information that the explosion data give about hydrodynamics.

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Asia Minor, plus many in South America, also Canada and the United States.

Direct national financing was found to be the practice in more than one-half the countries studied. Everywhere the trend seems to be toward the national governments assuming a greater share of the costs of irrigation. The greatest disparity in methods occurs, he said, in how the various governments recoup their investments. Perhaps the most significant single trend is toward liberalization of repayments from the direct project beneficiaries.

Federal governments, including the United States and some other countries, participate to a greater degree in paying for some other types of water-control programs than for irrigation. The policy of the United States, he stated, is to improve or participate in the improvement of navigable waters or their tributaries for flood-control purposes if the benefits, to whomsoever they may accrue, are in excess of the estimated costs and if the lives and social security of people are otherwise adversely affected.

Science News Letter, July 24, 1948

Magnetic highway sweepers which pick up nails and other metal scraps are now widely used in America; where used they gather an average of 8.2 pounds of metal per mile per year, 75% of which is tire-damaging material.



QUICK-READING TEMPERATURE-CONVERSION TABLES

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MEDICINE

Counteract Barbiturates

► PEOPLE who take overdoses of the barbiturate sleeping medicines, either by accident or with suicidal intent, may in future be saved by having a kind of tourniquet put around the middle of the chest to constrict it.

This possibility appears in a report by Drs. Augustus C. P. Bakos and William L. Howell of Georgetown University School of Medicine in the journal, *Science* (July 9).

The barbiturate sleeping medicines affect the breathing center in the brain. When a poisonously large dose has been taken, breathing goes on only through reflex drives. But at this stage, the rate of breathing in dogs can be increased by compression of the chest, the Georgetown scientists found. The compression was done with the kind of cuff doctors use in taking blood pressure. This seemed to elicit and maintain a reflex from the lungs which kept the animals breathing even when the breathing center in their brains had been deadened by the drug.

Preliminary observations, the scientists report, show that the maneuver may be effective in cases of barbiturate poisoning, although not enough data have been obtained to be sure.

Science News Letter, July 24, 1948

ENGINEERING

Most Nations Sponsor Big Water Control Projects

► MOST national governments provide the funds directly for construction of major water conservation and control structures, including those for irrigation, the International Congress on Large Dams was told at its meeting in Stockholm, Sweden, by Michael W. Straus, American Commissioner of Reclamation.

He reported on a study made of practices in 21 nations, perhaps the first world-wide investigation of this subject ever made. The study included Australia, New Zealand, Russia, China, India and the nations of

• New Machines and Gadgets •

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❁ **TOOTHBRUSH COMBINATION** has a hollow plastic handle to hold enough toothpaste for several brushings. The paste is applied to the bristles internally by pressure from a plunger contained in the handle which forces the paste through the handle and up onto the brush through a tiny capillary tube.

Science News Letter, July 24, 1948

❁ **HEARING AID**, for temporary use by persons with slight hearing loss or for anyone where the sound level is below ordinary conversation, is a single unit to be carried in the pocket and held to the ear only when needed. Microphone, vacuum tubes, batteries and other essentials are all within the half-pound package.

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❁ **RUBBER MAT** for the relief of fatigue from standing contains several thousands of small resilient cells which provide shock-absorbing action, without any annoying sensation of too much softness. Because of the ridged underside construction, it is safe from skidding.

Science News Letter, July 24, 1948

❁ **AUTOMOBILE PAINTING mitt**, shown in the picture, replaces the brush



and consists of a moisture-proof fabric to which a cotton pile fabric, with which the paint is applied, is attached with snappers. The mitt is part of kit which contains enough of a free-flowing enamel paint to cover a car twice, and also a dirt-remover, sandpaper and a crack-filler.

Science News Letter, July 24, 1948

❁ **VENT PLUG** for a storage battery tells the water level at a glance without removal of the plug. The device, made of clear plastic, extends down into the battery with its lower end, which is a pyramid in shape, immersed if it is at a proper level. Looking down the vent the bottom is black if immersed in water; otherwise the words "add water" are visible.

Science News Letter, July 24, 1948

❁ **ELECTRIC CORN POPPER**, now patented, is a covered vessel with a side handle, and a heating element enclosed in a space in its bottom somewhat similar to the arrangement in an electric coffee maker. An added feature is a wire agitator, with a crank end above the cover, which can be rotated to prevent the corn from burning.

Science News Letter, July 24, 1948

❁ **VENETIAN BLINDS** become a removable slat type with the use of special clips through which the ropes pass instead of through slots in the individual blades. The clips are easily fixed in place on the rear of the ladder tape by means of their piercing points. Slat may then be removed for easy cleaning.

Science News Letter, July 24, 1948

• Nature Ramblings

by Frank Thone

► **OYSTERS**, especially if served raw, are very likely to provoke that classic wisecrack about the degree of courage that must have been possessed by the first man who ever ate an oyster. There are, of course, plenty of people who haven't plucked up that much courage even yet. To whom the true ostreophile always remarks, "So much the better; it leaves more oysters for me!"

Whoever the first oyster-eater was, he must always remain nameless, for he was prehistoric. There is, however, no need for erecting a monument to his anonymous memory, for he and his numerous descendants have left plenty of monuments to their liking for oysters and other shellfish on beaches all over the world. There are shell-mounds that the uninitiated easily mistake for low natural hills. These are the accumulated relics of oyster-roasts and clambakes that must have gone on continuously for centuries. There are even similar mounds of snail-shells in North Africa—the obvious witticism being that this must be the original home of Frenchmen.

But oysters and clams and snails are only

Was It Courage?



the beginning of the catalog of strange foods that people eat in various parts of the world. Insects, both as larvae and adults, are prominent items. Tastiest, probably, would be the grape-bellied honey-ants of Mexico. More widely distributed is the eating of locusts, which are simply big, fat grasshoppers: these dainties are consumed in many lands where locusts swarm, all the way from the Mediterranean basin to the Philippines. There has even been a government bulletin giving recipes for their

proper preparation and cooking.

Strange sea dainties are to be found on the menu, too: squid and sea-urchins in southern Italy, sea-cucumbers and the giant sea-worm known in its dried form as *beche-de-mer* in the South Seas, and of course the inevitable bird-nest soup and shark-fins of "real" Chinese restaurants. Raw fish is eaten just about everywhere. Mark Twain recorded, with a proper inlander's shudder, seeing native Hawaiians eating fish "raw and alive!" when he visited the islands eighty-odd years ago.

The chances are that this business of eating "queer" foods was pioneered not by any bold man but by one of our pre-human ancestors who was merely hungry and lacked the means for killing and cooking larger game. Certainly our existing simian poor relations are not too discriminating in their choice of tidbits; some species of them at least will eat insects and their grubs, eggs and young birds, centipedes, scorpions and fat spiders. It may be, after all, that oyster-eating is just an evolutionary hang-over.

Science News Letter, July 24, 1948